JOURNAL
OF THE EAST AFRICA NATURAL HISTORY
SOCIETY AND NATIONAL MUSEUM

VOL. 28 15th MAY 1971 No. 122

MARINE BOTANY OF THE KENYA COAST
5. A Third List of Kenya Marine Algae

By

WM. EDWYN ISAAC*

University College, Nairobi

ACKNOWLEDGEMENTS

The work recorded in this fifth paper in the series on the Marine Botany of the Kenya coast was made possible chiefly by the financial support of the Rockefeller Foundation whom I wish to thank for their generosity.

During my visit to Australia in 1968 I received help from a number of marine phycologists including A. B. Cribb and Mrs. Sophie Ducker for which help I wish to offer my thanks. Thanks are also due to Professor Robertson of Adelaide University, Professor Turner of Melbourne University and the Curator of the National Herbarium Melbourne and his staff for providing space and facilities for my work. Especial thanks are due to Dr. Bryan Womersley and his phycological colleagues at Adelaide University for the considerable help given me in discussion, identification of specimens and the provision of photostat copies of relevant parts of phycological works not obtainable in East Africa. I look back with considerable pleasure to the profitable and enjoyable time, all too short, which I spent in the Botany Department of Adelaide University.

Many other phycologists have generously helped me by naming algal specimens and to these I tender my thanks. Specific acknowledgement is made in the appropriate places in the sequel. Special mention must be made in this connection of Dr. William Johansen and Dr. W. H. Adey.

I wish to thank J. B. Gillett of the E. A. Herbarium for steering the paper through the press after my retirement to Australia.

Lastly but by no means least, my thanks are due to my wife, Mrs. Frances M. Isaac, for the considerable help she has given me in collecting, mounting, correspondence, preparations for the identification of specimens and in drawing the figures and maps for this paper.

*Present Address: Flat 4, 35 Clyde St., East Kew, Victoria 3102, Australia.

INTRODUCTION

This paper has been written on the eve of leaving Nairobi on retirement. Hence more items have been recorded without further delay than would otherwise have been the case, in the hope that these records will be of value to other East African botanists.

Literature cited has been of publications available to me in Nairobi or consulted during my visit to Australia or made available in Adelaide as photostat copies.

The specimens which have been collected in the course of investigations reported in this series of papers are housed in the Botany Department Herbarium, University of Nairobi and the East African Herbarium Nairobi except for certain specimens which will be retained for the present by the author for further possible investigations. A number of specimens will also be housed in the Botany Department University of Adelaide.

As well as a map of the Kenya Coast indicating localities cited (Map 1), a detailed map of the Diani region has been included since much of the collecting for these papers has been done there. The names on this map are frequently used on the labels on herbarium specimens and may be of service to future collectors. (Map 2).

CYANOPHYTA

Lyngbya majuscula (Dillw.) Harv. ex Kuetz., was recorded in the second list of Kenya marine algae (Isaac, 1968). The specimens concerned have been re-named by Drouate (1968) as *Microcoleus lyngbyaceus* (Kuetz.) Crouan. It is included in the list below under this name.

The few genera collected are arranged alphabetically. The numbers cited except for some of those for *Microcoleus lyngbyaceus* were determined or confirmed by Drouet. The other numbers for this species were determined or confirmed by Dr. Josephine Koster.

Anacystis aeruginosa (Zanard.) Drouet et Daily.
4272. Diani.

Hormothamnium enteromorphoides Grun.
4529. (With some *Microcoleus lyngbyaceus*) 4530. Diani.

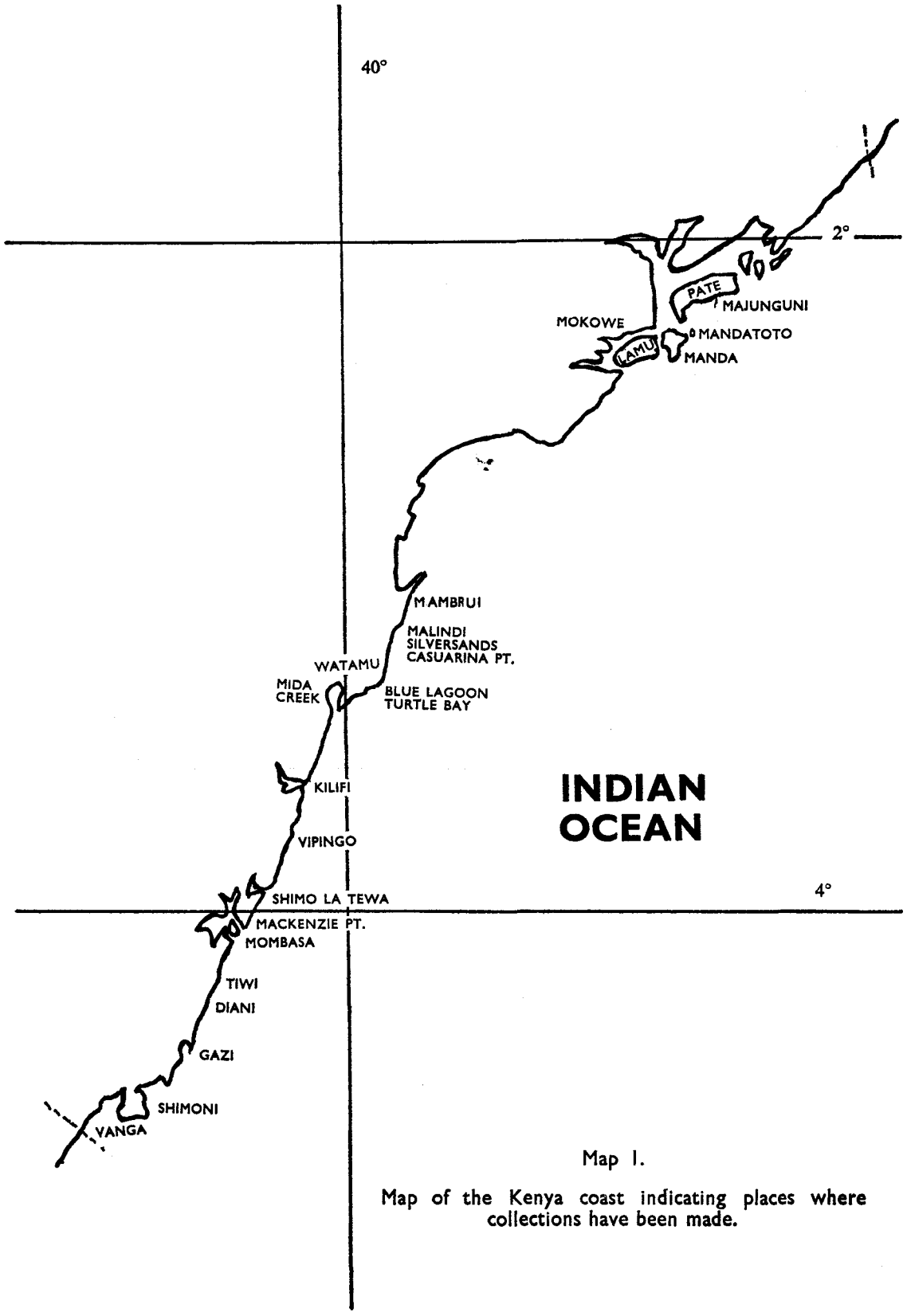
Microcoleus lyngbyaceus (Kuetz.) Crouan
2679, Gazi.
3812, Malindi Casuarina Point.
4373, 4524, 4525, Diani, (the last two with *Schizothriz calcicola*)
4528, 4531, 4684, 4685, Diani; 4684 (with *Schizothrix mexicana.*).

Additional records.
2506. Diani.
2711. Mida Creek.
3220. Mokowe, Lamu Distr. Mangrove Mud flats.
3293. Majunguni, Lamu Distr.
3294. Pate Island, Lamu Distr. Very common epiphyte on *Cymodocea ciliata.*
3832. Mambrui.

Oscillatoria submembranacea Ard. & Straff.
3821, Malindi, Casuarina Point.
4553 (with *Schizothrix calcicola.*), 4658, Diani.

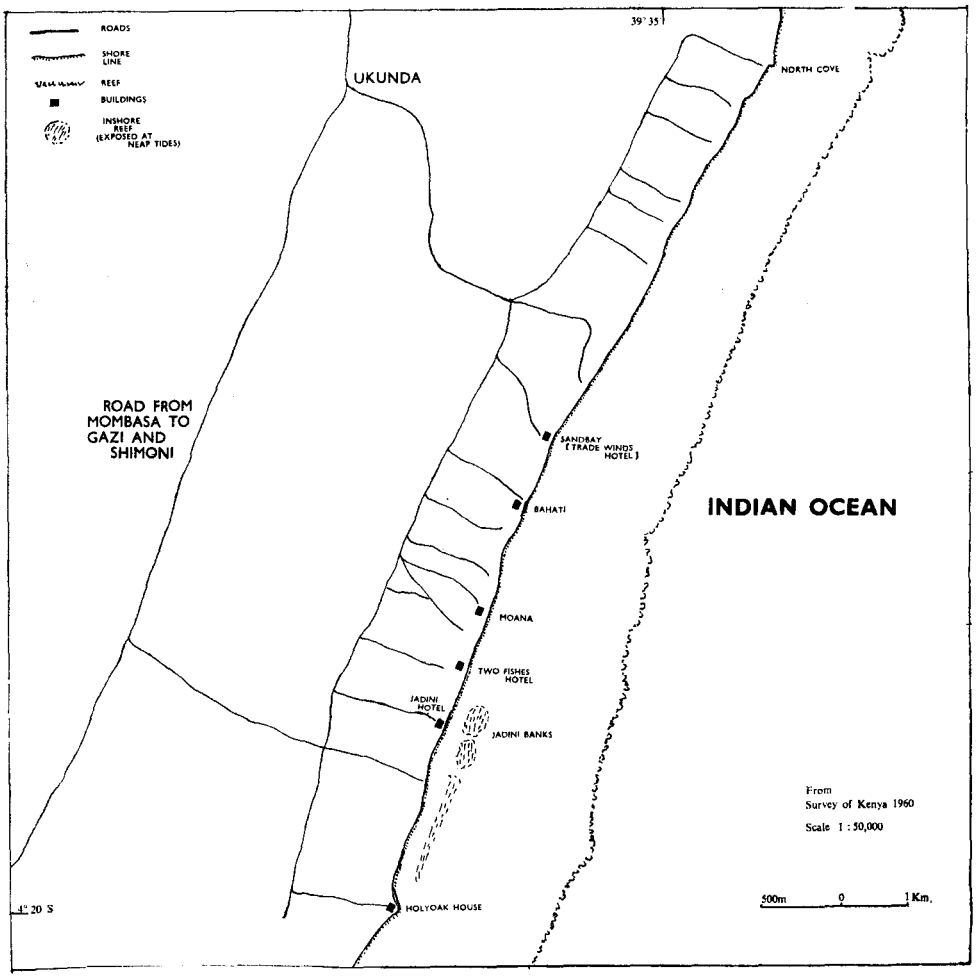
Schizothrix calcicola (Ag.) Gom.
4525, Diani (with *Microcoleus lyngbyaceus*)
4683, Gazi.

S. mexicana Gom.
3909, Malindi, Silversands.
4353, 4684, Diani (latter with some *Microcoleus lyngbyaceus*).



Map 1.

Map of the Kenya coast indicating places where collections have been made.



Map 2.
Map of the Diani area
Diani Beach is generally regarded as extending from North Cove to the point below Holyoak House

CHLOROPHYCEAE

Ulotrichales

Ulva spp.

Two reticulate species of *Ulva* occur abundantly on south and central Kenya coasts. One of these is *U. reticulata* Forsk. . Material of the other species has been shown or sent to a number of phycologists including A. B. Cribb, Papenfuss and Womersley and the available literature has been carefully examined but the taxon has not been recognised as a known species and no description has been found corresponding to this East African alga. The probability would seem to be that this plant is an undescribed species.

As compared with *U. reticulata* it is of a lighter green colour; of flimsy, soft consistency; spreads out into a greater or lesser number of more or less fan shaped parts (Fig. 3); has squarer less elongated cells (Fig. 4); is more regularly fenestrated, the fenestrata decreasing in size towards the periphery (compare Pl. 1 Figs. 1 & 3).

It is a beautiful silky soft plant lacking the firm consistency of *U. reticulata* and the outer tangential walls of the cells are not as thick as those of *U. reticulata.* (Pl. 1 Fig. 2). Because of the spreading fan-like nature of the segments of this plant it lacks the wholly elongated appearance of *U. reticulata.* There are narrow irregular elongated portions linking the fan-like sections. These 'fans' have an outer border which is non-fenestrated or with few minute scattered fenestrations.

The two reticulate species occur epiphytically entwined and entangled with other algal species both in pools and on rock surfaces decreasingly from about mid-tide level downwards. They are often intermingled.

Ulva reticulata Forsk.
3519 Diani 5.7.67
3815 Malindi 1.12.67
4420 Diani 15.4.68
4498 Diani 30.11.68

Ulva sp.
2922 Shimo la Tewa 10.12.65
3492 Diani 30.6.67
3510 Diani 4.7.67
4398 Diani 13.4.68
4422 Diani 15.4.68
4486 Tiwi 29.11.68

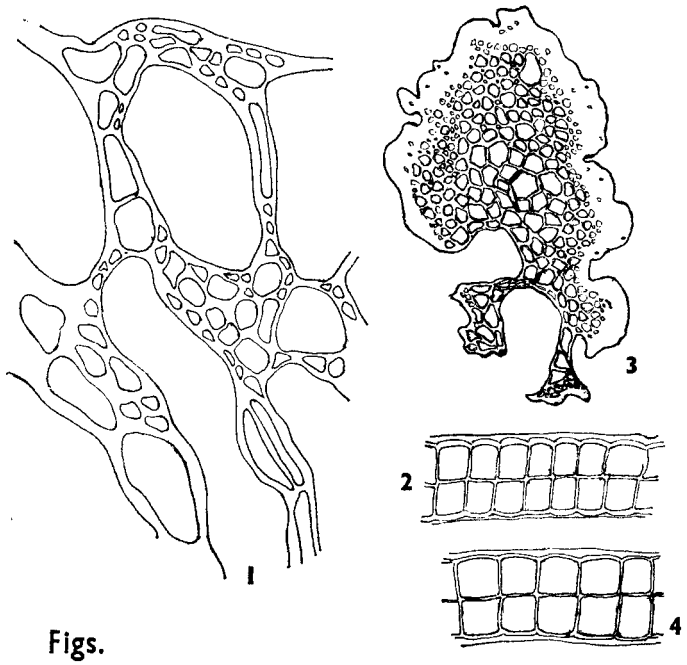


Plate I

Figs.

1. Ulva reticulata part of plant, half natural size.
2. ,, ,, section of thallus x 160
3. Ulva sp. part of plant, half natural size.
4. ,, ,, section of thallus x 160

SIPHONALES

Avrainvillea capituliformis Tanaka

Tanaka, T., 1967, pp. 14–16, Plate 1.

The numbers listed below were investigated by Dr. Womersley who considered them to correspond to this species as described by Tanaka. Womersley, however, is inclined to the view that this taxon is best regarded as a loosely tufted form of *A. erecta.* As these specimens are of very distinctive appearance in the field they are tentatively here included under *A. capituliformis.*

1724. Turtle Bay. Aug. 1961.
2968. Malindi, deep pool below the Vasco da Gama padrao. 4.4.66.
3384. Turtle Bay. 5.4.67.
3992. Mombasa, Mackenzie Point. 8.12.65.

Bryopsis pennata Lamour. var. *leprieurii* (Kuetz.) Collins & Hervey

Identification confirmed by Durairatnam.

Taylor 1960, p. 132 characterises this variety as having few, short branchlets, sometimes unilateral and in discontinuous series, the axis in between being naked.

One collection of identified and confirmed material:
3346, Turtle Bay Watamu District.

Agrees with Bermuda material in Botany Department Herbarium, Melbourne (ex. Herb. Bernatowicz).

While only one collection was made of this variety, *B. pennata* (previously recorded: Isaac, 1967) was collected in four localities at intervals over the greater length of the Kenya coast, as follows:—

2421, Manda Island, Kitau: Lamu region.
3077, 4721, Malindi, near and at base of the Vasco da Gama padrao.
2537, 4715, Tiwi.
3990, Mombasa, Mackenzie Point.

Chlorodesmis fastigiata (C. Ag.) Ducker

Previously known as *Vaucheria fastigiata* C. Ag. and *Chlorodesmis comosa* Harvey & Bailey.

For discussion of nomenclature see Ducker, 1969 and for an account of the plant as *C. comosa* see Ducker, 1967.

3257, Lamu district, Manda Kitau. Det. Ducker.

C. hildebrandtii A. & E. S. Gepp

Ducker, 1967, p. 164.

2962, Diani
3327 Lamu region: Ras Takwa, Manda Island.
3421, Watamu, Turtle Bay.

All determined by Ducker.

C. major Zanard.

Ducker, 1967, p. 167.

3566, Diani
3830, Mambrui.

Both determinations by Ducker.

C. caespitosa was recorded in the first list of Kenya marine algae (Isaac. 1967) but for the sake of completeness the numbers and localities are given below, All of these numbers except 3599 and 4418 were either determined or confirmed by Ducker.

2497, 2682, 3599, 4418: Diani.
2973, Malindi, below Vasco da Gama padrao.
3005, 3363, 3403; Watamu, Turtle Bay.

On the Kenya coast *Chlorodesmis* is much more abundant during certain times of year than at others. Material has been collected in early December, late March, first half of April, late July and in August. In part, these records reflect the times of year during which visits have been made to the coast but this is not entirely the case as frequent visits have been made in later December and in January and at best very little *Chlorodesmis* has been found during this time of year. The matter needs careful investigation but on the basis of existing records the indications are that these plants are most common during the periods of higher sea temperatures with the lower spring tides occurring during hours of darkness and absent or scarce during periods of lower temperatures and lower spring tides during daylight hours. (For discussion of sea temperatures and tides on Kenya coast see Isaac & Isaac, 1968).

It is a pleasure to record acknowledgement to my former student Miss S. Moorjani for making the measurements included below in dealing with *Codium* specimens.

Codium extricatum Silva

Silva: 1959, pp. 145–147. Plates XIII and XIV.

1996. Diani Beach 15.3.65. Small plant, about 1½ cm. high. General morphology agrees with Silva's diagnosis.

Utricles cylindrical to slightly clavate with slightly rounded to rounded apices and separate out individually. Utricles 490 μ—584.6 μ long x 79—142 μ; wall 1.5 μ; apex 4–6.8 μ.

Hairs 35–70 μ. below apex.

Medullary filaments, 24 - 32 μ diameter.

The anatomical features fall within the range given by Silva except that the utricle wall is thinner.

2555. Tiwi. 1.8.65. Plant small, about 1.5 cm. high but showing a tendency to flattening throughout.

Utricles sub-cylindrical to clavate and separating out individually; 395–727 μ long x 63.2–189.6 μ diameter; wall 1.5 μ thick and apex 4–8 μ.

Hairs 48–80 μ below apex.

Medullary filaments, 20–32 μ diameter.

Two deviations from Silva's account may be noted:

a) wall of utricle thin, b) lowest diameter of utricle below Silva's lowest limit.

2708. Watamu, Turtle Bay. 26.8.65.

About 2 cms. high with a tendency to general flattening. Utricles, 537.2–632 μ long by 140–205.4 μ broad;

Wall 1.5 μ, 4–10 μ at apices which are sometimes lamellate.

Hairs, 60–90 μ below apex.

Medullary filaments, 24–32 μ diameter.

Good agreement except for thickness of utricle wall.

2793. Watamu, platform between Turtle Bay and Blue Lagoon. 27.8.65.

Plant about 5 cm. high.

Utricles, cylindrical to slightly clavate and dissecting out individually; 342.4–584 μ long and (79)—126–300 μ diameter, wall 1.5 μ and apex 4–8 μ.

Hairs, 20–60 μ below apex.

Medullary filaments, 24–32 μ diameter.

Apart from the thin utricle wall the chief deviations being one utricle with a diameter of 79 μ the lower limit given by Silva being 88 μ and hairs occurring 20–60 μ below utricle apex while Silva gives 40 μ as upper limit below apex.

3190. Diani, 17.3.65.

Up to 7 cms. high.

Utricles sub-cylindrical and separating out individually; 553–584.6 μ long and apart from one with a diameter of 63.2 μ, a diameter range of 94.8–158.0 μ; wall 1.5–2 μ thick, apex 3–12 μ.
Hairs, 32–80 μ from utricle apex (cf. Silva's upper limit of 40 μ.).

Codium pocockiae Silva, Approx.
Silva: 1959, pp. 138–140. Plate XII, v.; Fig. 14.

2554. Tiwi, 1.8.65.
A small plant about 2.5 cm. high. The general morphology and the character of the utricles are in agreement with Silva's account except that the utricles are shorter—110.6–126.4 μ diameter by 410.8–616.2 μ long. The dimensions for utricle wall thickness, placement of hairs from utricle apex and diameter of medullary filaments are within the range given by Silva.

2557. Tiwi, 1.8.65.
Small plants up to 3.5 cm. high. This number is tentatively included under *C. pocockiae* with misgivings. The general morphology of the plant, the separation into individual utricles, the diameter dimensions of utricle wall and medullary filament agree with Silva's description. The utricle size, however, shows a divergence: 94.8–173.8 μ diameter x 426.6–616 μ long. Further, the placement of hairs from the apex is 20–56 μ as compared with Silva's range of 50–105 μ. and most of the utricles show a slight although distinct constriction 128–158 μ below apex. No asymmetrical lamellate thickening of the apex was observed.

Halimeda renschii Hauck
De Toni, Vol. 1., 1889, p. 525.
As *H. opuntia* Lam, forma *renschii*
Barton: 1901, p. 21.
Hillis, 1959, p. 360. Here *H. opuntia* f. *renschii* (Hauck) Barton, is included under *H. opuntia* (Linn.) Lamour. var. *opuntia.* Dr. Llewellya Hillis Colinvaux intends publishing a note reviving the old species *H. renschii* Hauck (Private communication).

A number of specimen of this taxon were collected on the Kenya coast and in the Seychelles.

It was observed when collecting these plants that they differ from what is usually considered as *H. opuntia* in that there is a marked basal concentration and a fanning out upwards. The holdfasts are often not easy to see as the basal parts are so closely massed together. The plants form dense masses largely or mostly above substratum level. A number of specimens were examined by Womersley at Adelaide who reported as follows: " . . . . distinct holdfast region, erect fronds branched in one plane except near the base, densely tufted. Segments flat, small. Outer cortical utricles small (12–20 μ across in surface view), secondary utricles small, not inflated; surface utricles polygonal, remaining attached. Nodal filaments in pairs (3 or 4) attached for a short distance, tendency to form a loose and easily broken plate."

After further discussion it was agreed that the material should be submitted to Colinvaux who replied: "Your material I feel is the old species *H. renschii* . . . ."
2130, Diani, 19/3/65.
2786, Watamu, Turtle Bay. 27.8.65.
3015, „ „ „ 6.4.66.
3063, Diani, 17.3.65.
3193. „ 27.12.66.

Siphonocladales

Boodlea montagnei (Harv. ex J. E. Gray) Egerod
Egerod, Lois E., 1952, p. 332 (footnote).
Setchell, "The genus *Microdictyon*", 1929, pp. 573–580 as *Microdictyon montagnei* Harv.
Only a few collections of this species were made on the Kenya coast.
2370. Mokowe, Lamu District. Mud flats to seaward of mangroves. 30.6.65.
4492, 4493. Tiwi. 29.11.68 } Common in pools close inshore on dead reef.
4569. ,, 22.12.68 }

Spongiose to a greater or lesser degree, especially Tiwi plants. 4.5 to 11.0 cm. across. Meshes of net mostly square to oblong, branches arising at right angles to axis and opposite. The connecting tenacula (cells with more or less frilly margins) evident especially in Tiwi material.

Spongocladia vaucheriaeformis Areschoug.
Okamura, K., *Icones*, **5**, 1928, pp. 189–90. pl. 250, fig. 5–12.
Gerloff, J., 1960, pp. 612–614.
Boergesen, 1946, p. 17; 1948, pp. 23–24 under heading "A Note on *Cladophoropsis*"
Sub-nom, *Cladophoropsis vaucheriiformis*
Cribb, A. B., 1960, pp. 11–12.

Papenfuss after a review of the evidence considered *Spongocladia* and *Cladophoropsis* to be congeneric and he considered that it would be advantageous to reject *Spongocladia* in favour of *Cladophoropsis* (Papenfuss, 1950).

The Kenya plants of this species living symbiotically with a sponge are so distinctive in appearance as compared with other Kenya *Cladophoropsis* that the generic name *Spongocladia* is retained.

Gerloff states that the sponge is probably *Halichondria* and he reviews the evidence for the taxonomic nature of the algal partner but without coming to a definite conclusion which he considers will only be possible by means of cultures without the presence of the sponge. (Gerloff, 1960). Boergesen also discusses the nature of the algal constituent and while not excluding the possibility that more than one taxon may be involved, he favours the view that the alga is *Cladophoropsis*.

This is a widespread plant on the Kenya coast, growing at lower intertidal levels near the reef edge. It forms large expanses of dull green colour, often 15 cm. or more in diameter and of a tough consistency. Both flat surface forms and forms with a larger or smaller number of finger like upright processes occur.
4471. Diani. 31.3.68. Mostly flat with smaller finger like upright growth.
4472. ,, ,, More numerous and larger upright processes.
4473. ,, ,, Flat spreading growth, no prominent erect processes.
4521. ,, 2.12.68.
4522. Tiwi. 29.11.68.
4537, 4538. Diani. 19.12.68
4788. ,, 16.12.67
4789. Mombasa, McKenzie Pt. 8.12.65.
4790. Diani, 20.12.68.
Coll. P. J. Greenway 9337. (East African Herbarium, Nairobi).
det. Gerloff.
Takawanda, Pate Island 10.10.57.
Max. diameter 14.5 cm. Plate like with some lacunae away from margins and with small upright growths.

Valonia fastigiata Harv. ex J. Ag.
Dawson, 1957, p. 101, Fig. 1.
Egerod, 1952, p. 348.
Egerod deals with this species in her section on *V. aegagropila* in which she indicates that *V. fastigiata* is a much more robust and larger plant with more uniformly cylindrical vesicles and more regularly branched.
One collection was made of this species.
3827. Mambrui, 2.12.67. Identified by A. B. Cribb.
2–3 cms. high and vesicles up to about 0.5 cm diameter.
This species is common in places on Mafia Island, Tanzania where it was found in large clumps in quiet waters often shaded by overhangs.

Dasycladales

Acetabularia clavata Yamada.
A. exigua Solms—Laubach.
A. moebii Solms—Laubach.
Moorjani, S. A., "Notes on Kenya *Acetabularia* Lamouroux"
Jl. E. Africa nat. Hist. Soc. Vol. 28, No. 1 (119), pp. 47-52
These species are merely noted here as details will be found in Miss Moorjani's paper. The plants were cultured in the Botany Department, Nairobi from material collected at Diani.

PHAEOPHYTA

Dictyotales

Dictyota dichotoma var. *intricata* (Ag.) Grev.
Cribb, A. B., 1954, p. 20, Plate 3, fig. 4.
The specimens collected agree well with Cribb's figure and with South African plants of this taxon except that the Kenya plants collected are longer.
Papenfuss (1944) points out that this plant is usually named *D. dichotoma* var. *implexa* but he presents evidence that the correct name should be var. *intricata* (Ag.) Grev..
3292. Majunguni, Pate Island. 28.3.67. Epiphytic on *Cymodocea ciliata.*
3373. Manda Kitau. 27.3.67. Epiphytic on *Sargassum binderi.*
These plants up to about 23 cm. long; twisted to a greater or lesser extent; width usually about 1 mm.

Stoechospermum marginatum (Ag.) Kuetz. Included in list I of Kenya marine algae. (Isaac, 1967).
Among the specimens from the Kenya coast were a number of smaller, broader plants, broadening out to the apex of each branch to a greater extent than in most of the other specimens of *Stoechospermum* collected. These characteristics give the plants a distinctive appearance. They correspond to plants in the Melbourne National Herbarium which are named *S. patens* Hering. This plant is included by De Toni under *S. marginatum.* (De Toni, 3 1895, p. 251). Zanard. 1858, p. 247 also includes *S. patens* under *S. marginatum.*
2912, Mombasa, Mackenzie Pt. 8.12.65.
3843, Mambrui, 2.12.67.
Typical form—
2403. Kitau, Manda Island. 2.7.65. Tetrasporic.
2442. Manda Toto Island. 4.7.65. (Fertile, cast up, epiphytic on *Cymodocea ciliata.*)
2768. Watamu 28.8.65. Tetrasporic.

2912. Mombasa, Mackenzie Pt. 8.12.65. Tetrasporic.
3611. Diani, 20.8.67. Tetrasporic.
3844. Mambrui, 2.12.67. „
4709. Diani, 1.8.69. „

Punctariales

Rosenvingea intricata (J. Ag.) Boergesen
Cribb, A. B., 1954, pp. 23–24, Pl. 2, fig. 4.
Kuet., 1859, Vol. **9**, Pl. 5, Fig. 1. (as *Encoelium intricatum*).
Further references will be found in Cribb's paper.
2796. Watamu. 28.8.65.
Small plants, up to about 3.5 cm. and a flattened width of up to about 3 mm. The plant shows a dense branching growth similar to that reportedly shown by Queensland plants (Cribb, 1954, p. 24) and illustrated for Gulf of California plants by Dawson (1944, Pl. 52. 1). This compact type of growth contrasts with the laxer branching illustrated by Taylor (1942, Pl. 10, Fig. 2.).

Fucales

Sargassum. This genus is an ubiquitous and prominent feature of the Kenya coast, the plants occurring mostly in large pools and channels from about mid-tide level seawards; and at and beyond low tide levels of spring tides.

There are many taxa and at least some of these clearly show considerable variation. The range of variation, the absence in Kenya of collections of named species, the paucity of relevant literature and the limited time available to me have made it impossible to give a reasonably complete list of Kenya species of this important genus.

Sargassum duplicatum J. Ag. and *S. latifolium* (Turn.) C. Agr., were included in my first list of Kenya marine algae (Isaac, 1967). A few more species are listed below.
S. binderi Sond.
Durairatnam, 1961, p. 45.
Plants relatively small. Maximum length of plants collected 52 cm. but most plants less than 30 cm. Erect branches arise from a very short main axis; branch axes are flat or compressed with distichously arranged leaves; vesicles borne on flattened leaf like stalks; receptacles axillary on flat branches with warty, denticulate margins; aggregated in dense cymes.
2415. Manda Island. 2.7.65.
2762. Watamu. 28.8.65.
2950. Diani. 28.12.65.
2984, 2985, 2986, 3023, 3025, Watamu. 4th. and 7th. April 1966.
3028. Watamu. 7.4.66. Identification confirmed by Durairatnam.
3555. Diani, outer reef. 10.8.67. Identification confirmed by Durairatnam.
4342. Malindi, Silversands. 4.12.67. In pool.
4346. Malindi, Casuarina Point 1.12.67. Identification confirmed by Durairatnam.
Note: the leaves of this specimen are broader than in nearly all the specimens included under this name in the Melbourne National Herbarium including the Sonder material.
4351. Malindi, Casuarina Point. 1.12.67. A narrow leaf form.
S. ilicifolium (Turn.) Ag..
Turner, 1808, 1. pp. 113–114, Pl. 51. as *Fucus ilicifolius.*
Kuetzing, 1861, XI, t.46. I as *Carpacanthus iliciolius.* var. *venusta* Grun. (?), Boergesen, 1933a., p. 14, Pl. 4.

The Kenya plants of this species collected showed a range of variation but on the whole there was good agreement with the illustrated account given by Turner. Some longer leaved plants showed at least a fair approximation to var. *venusta.*

2982. Watamu. 5.4.66.
3024, 3027, 3394. Watamu. 7.4.66.
4275. Diani. 19.12.67.
4348, 4350. Malindi, Silversands 3rd and 4th. 12.67.
4431, Diani. 4.4.68.
4561, 4562. Diani. 20.12.68.

S. polycystum C. Ag.

Durairatnam, 1961, p. 46.
Agardh, J. G., 1889, p. 119. *sub nom. S. brevifolium* Grev. 1849, pp. 108–109, Pl. 4.

The production of numerous creeping stolons, numerous small vesicles with prominent pores and small to moderate sized leaves on long thin branches are characteristic features. The degree of murication varies and is described by Durairatnam as giving the plant a "muricated appearance" and as "somewhat muricate" by Greville. Some plants would seem to be free or almost free of murications while parts of other specimens are heavily muricated.

2306. Diani. 13.6.65. Murications prominent in parts.
2414. Kitau, Manda Island. 2.7.65. Somewhat elongated leaves, moderate murications.
2458. Manda Toto Island 4.7.65. Elongated leaves, murications not a prominent feature.

S. swartzii (Turn.) Ag.

Durairatnam, 1961, P. 44.
Sub-nom. Fucus swartzii, Turner, 1819, Vol. **4.** pp. 120–121, p. 248.

A stiff, upright plant with frequent bifurcating leaves the margins of which are entire or dentate. Most of the Kenya plants collected had few or no vesicles and were in general vegetative only.

Mostly dark coloured plants becoming almost black on drying.

Durairatnam includes *S. acutifolium* Grev. in this species and certainly plants were collected with very narrow and terete leaves as illustrated by Greville for *S. acutifolium* (Greville, 1849, Pl. 10).

1986, 2244. Diani Beach. 1.1.65.
3184. Watamu, Turtle Bay. 5.4.66.
4349. Malindi, Silversands reef. 3.12.67.
2457. Manda Toto Island. 4.7.65. Many vesicles.
2766. Watamu, headland between Turtle Bay and Blue Lagoon. 27.8.65. Det. M. Durairatnam.
2823, 2865. Watamu. 27th and 28th. Aug. 1965.
4406, 4407, 4450, 4451, 4455. Diani, outer reef. 14.4.68.

S. wightii. Grev.

Greville, 1849, p. 217, Pl. 9.
Durairatnam, 1961, p. 43.
Boergesen, 1933a., pp. 13–14.

Only a few plants of this species were collected and the identification is regarded as tentative.

2456. Manda Toto Island, 4.7.65. The identification was suggested by Durairatnam.
4386. Diani, cast up. 4.4.68. A very narrow leaf form.

RHODOPHYTA

Nemalionales

Galaxaura breviarticulata Kjellm.
Boergesen, 1942, pp. 54–56, Fig. 26; 1957, p. 8.
Some plants have longer and/or broader segments than the dimensions given by Boergesen.
2696. Diani. 13.8.65.
3824. Malindi—Casuarina Point. 1.12.67.
3983. Watamu District, Turtle Bay. Aug. 1961.
4516. Diani. 2.12.68. Segments broad.
4725. Malindi—Casuarina Point. 3.8.69.
G. cylindrica (Ell. & Sol.) Lamour.
Chou, 1947, pp. 5–7, Pl. 8, Fig. 1.
See under *G. oblongata.*
4515. Diani Beach, pools in outer reef. 2.12.68.

G. filamentosa Chou
Svedelius, 1953, pp. 33–38; Figs. 29, 30, 33.
Only a few plants were collected. In view of Svedelius' account of geographical distribution this was perhaps an unexpected record for the Kenya coast. An anatomical examination of the Kenya plants, however, showed the characteristics attributed to this species: poorly developed supporting cells to the assimulatory filaments, absence of tumid basal cells, absence of sharp differentiation as between medullary and cortical layers.
4509. Diani, outer reef, (only three plants found) 2.12.68.
4780. Tiwi—pools on outer edge of reef. 30.12.69.

G. oblongata (Ell. & Sol.) Lamour.
Chou, 1947, pp. 7–9, Pls. 2, 3, 9.
Boergesen, 1942, pp. 49–50; 1949, pp. 41–44.
Chou points out the close similarity between this species and *G. cylindrica* which ". . . are separated entirely on the basis of the diameter of the branches" those of the latter being very slender and commonly do not exceed 1 mm. diameter. (Chou, 1947, p. 6). On this basis the Kenya plants, in the main, best agree with *G. oblongata.*

Another very similar plant is *G. fastigiata* Decne. which is regarded by Chou as a physiological form of *oblongata.* Svedelius, however, maintains *G. fastigiata* and *G. oblongata* as closely related but distinct species (Svedelius, 1953).
3867. Mambrui. 2.12.67.
4551. Diani, outer reef. 20.12.68.
4552. ,, ,, ,, ,, . Possibly *G. cylindrica sensu* Chou
4778. Diani, pools. 26.12.69.

Scinaia furcellata (Turn.) Bivonia
Durairatnam, 1961, p. 48–49., Pl. 28, Fig. 2.
3849. Mambrui. 2.12.67. Identification confirmed by Durairatnam.

Yamadaella cenomyce (Decne.) Abbott
Abbott, Isabella A, 1970
In the first list of Kenya marine algae (Isaac, 1967), *Liagora cenomyce* Decne. was included. Subsequently a number of further specimens of this taxon were sent to Dr. Abbott for confirmation.

As a result of studying this material Dr. Abbott has established the genus *Yamadaella* and *Liagora cenomyce* now becomes *Y. cenomyce*. The following numbers were named by Dr. Abbott.

2059. Diani, outer reef. 16.3.65.
2653. Tiwi, 1.8.65.
4483. Tiwi, 29.11.68.
4745. Diani, outer reef. 5.7.65.
4747. Diani „ „ 1.8.69.

Gelidiales

Gelidium arenarium Kylin

Kylin, 1938, p. 8, Fig. 2,D.

4787. Diani. Epiphytic on *Cymodocea ciliata*. 12.1.67.

This species was described from material collected at Isipingo in the Durban area.

G. rumpii Dickinson.

Dickinson, 1949, p. 565, Plate 4.

Two new species of *Gelidium* from Natal (Richard's Bay) were described by Dickinson (1949)—*G. helenae & G. rumpii*. The differences between them are slight and it would not be surprising if further work on large collections were to show that there is only one species. The plants of this very limited Kenya material are even shorter than those described by Dickinson in the smaller species, *G. helenae* (27 cms.). On balance the Kenya plants seen agree better with the photograph of *G. rumpii* (Plate 4) than of *B. helenae* (Plate 3).

4791. (Herb. W. E. Isaac) Watamu, July 1968. Collector, F. Furmani.

Cryptonemiales

A. *Corallinaceae:* Articulated species.

Three species of articulated corallines were included in each of the first two lists of Kenya marine algae (Isaac, 1967, 1968). Subsequently much material of this group was sent to Dr. William Johansen of Clark University, Massachusetts between whom and the author there was correspondence regarding these plants. Dr. Johansen named a large number of specimens and clarified certain questions in correspondence. Most of the numbers cited below were named by him and a collection of named plants has been deposited in the Botany Department of Nairobi University. I am very grateful to Dr. Johansen for all the trouble he has taken.

Amphiroa anceps (Lam.) Decne.

Weber van Bosse & Foslie, 1904, pp. 93–95, Pl. 16, figs. 6–8.

4320, 4321, 4325. Malindi, Silversands. 3.12.67.
4481, Diani, 17.6.65.
4519. „ , 2.12.68.
4545, 4546, 4547, 4548, Diani—outer reef. 20.12.68.
4578, Tiwi, inshore. 22.12.68.

Some of the specimens named *A. anceps* by Johansen had been previously named *A. beauvoisii* (Isaac, 1967). Probably all the "*beauvoisii*" material needs re-examination and for the present the name should be withdrawn from the list of Kenya marine algae.

The Kenya material of *A. anceps* is very variable. Thus 4321 is a much broader, thinner and more flattened form than 4320 and 4325.

A. fragilissima (Linn.) Lamour.

Weber van Bosse & Foslie, 1904, pp. 89–91, Pl. 14, fig. 12.

Taylor, 1928, p. 204, Pl. 29, fig. 11, Pl. 36, fig. 6.

This species was included without specimen numbers A in second list of Kenya marine algae (Isaac, 1968).

3647, 3649, 3652. Diani, outer reef. 20.8.67.
3657, 3658. Diani. 10.8.67.
3958, 3959, 3961, 3962, 3964, 3966, 3967. Malindi, Casuarina Point. 1.12.67.
3973. Malindi, Silversands. 3.12.67.
4491. Tiwi, inshore reef. 29.11.68.
4611. Diani, 2.12.68.

A. tribulus (Ell. & Sol.) Lamour.
Weber van Bosse & Foslie, 1904, p. 99.
Taylor, 1928, p. 204, Pl. 29, figs 7 & 9; Pl. 36, fig. 1.
,, , 1960, pp. 406–407, Pl. 47, figs 4 & 5.
In general appearance this species recalls *A. foliacea* Lamour. Johansen agrees, however, that the bands of dark genicula are always broader and more prominent in *A. foliacea* than in *A. tribulus*. He adds ". . . . in *A. tribulus* the genicula are not as broad as the intergenicula." (Private communication).
3810. Diani. April 1964.
3960, 3963, 3965. Malindi, Casuarina Point. 1.12.67.
3970, 3974, 3995. Malindi, Silversands. 3.12.67.
4601. Diani, in surf at edge of outer reef. 20.12.68.
4610 ,, , outer reef. 2.12.68.
4659 Diani. 4.4.69.

Cheilosporium jungermannioides Rupr.
Boergesen, 1953, p. 26, Fig. 7.
3969. Malindi, Casuarina Pt. 3.12.67.

Corallina subulata Ell. & Sol.
Taylor, 1960, P. 410, Pl. 50, figs. 1 & 2.
In a letter Johansen notes: "I have studied this species in South Africa and have found that it is much closer to *Jania* than to *Corallina* (as exemplified by *C. officinalis*) and plan to elevate Decaisne's *Jania* group *Haliptylon* in the near future. Then this species will become *H. subulata* (Ell. & Sol.) Joh.".
3653. Diani, outer reef. 20.8.67.
3654. Diani, cast up. 13.8.64.
4482. Diani, cast up. 13.8.67.
4664. Diani, reef. 4.4.69.
Johansen comments that he strongly suspects that *C. subulata*, *C. polydactyla* and *C. mauritiana* all represent one species.

Jania adhaerens Lamour.
Taylor, 1928, Pp. 205–206; 1960, p. 413, Pl. 49, figs. 1 & 2.
Boergesen, 1953, p. 27.
Kuetzing, 1858, *Tab. Phyc.*, Vol **8**, Pl. 83, II.
Johansen notes in a letter: "*Jania* is confusing; your specimens seem to fit into two species. Specimens such as number 3656 contain plants of two sizes, however, and it is possible that three species are represented." A later letter in reply to an enquiry contained a comment on the differences between *J. adhaerens* and *J. capillacea*. "The small, divaricate, epiphytic Janias in South Africa mostly agree with the type of *adhaerens* although the range of variability in intergenicular dimensions varies from and includes those given for *J. capillacea*."
3646. Diani, North Cove. 30.6.67.
3656. Diani, Reef. 10.8.64.
3968. Malindi, Casuarina Point. 1.12.67.
4681. Tiwi, Moonlight Bay. Dense epiphytic growth on old *Sargassum* stipes. 6.4.69.

J. pumilla
Taylor, 1928, p. 206, Pl. 29, fig. 8.; 1960, pp. 414–415, Pl. 49, fig. 5.
Kuetzing, 1958, *Tab. Phyc.*, Vol. **8**, Pl. 83, I
4582. Tiwi, inshore reef. Epiphyte on *Turbinaria*. 22.12.68. Some of material is male.
The only collection made of this species.

In view of Johansen's identifications and comments, the occurrence of *Amphiroa beauvoisii* and *Jania capillacea* (included in the first list of marine algae: Isaac, 1967) on the Kenya coast needs confirmation. The same need of confirmation holds for *Amphiroa foliacea*, included in the second list (Isaac, 1968). *Corallina mauritiana* (list 2) possibly needs re-naming as *C. subulata*.

B. *Crustose Species*

The following identifications were made by Dr. W. H. Adey, Smithsonian Institution, Washington, D.C. to whom grateful acknowledgement is made. Dr. Adey reports that amongst the collection sent to him there were four undescribed species of *Neogoniolithon* and that if he can obtain additional material of these and other species he would like to accomplish a detailed study of the crustose corallines of the East African Coast.

The fact that most of the specimens cited are from the Diani Beach area is not significant. It was only towards the end of the working period that there was a chance for Mrs. F. M. Isaac to collect a few specimens in the hope that Dr. Adey would find time to identify them. On earlier forays crustose corallines were observed in all places visited where reef conditions prevail but they were not collected and studied.

Archaeolithothamnium erythraeum (Rothpletz) Foslie
3659. Diani—outer reef in pools and on edge of surf. 25.8.67.
4699. Diani—outer reef in pools and edge of surf. 20.8.67.
4673. Tiwi—Moonlight Bay in pools on inshore dead reef. 6.4.69.

Choreonema thuretii (Bornet) Schmitz
epiphytic with *Corallina subulata* on *Cymodocea ciliata*
3654. Diani. 13.8.64.
This name was given by Dr. H. W. Johansen.

Heteroderma sp.
4665. Diani—in pools on outer reef, 4.4.69 epiphytic on *Cymodocea*.
Crustose corallines of this type are present in abundance on all the broad leaved Marine Angiosperms wherever they occur.

Hydrolithon reinboldii (Weber van Bosse & Foslie) Foslie
4639. Diani—outer reef in depression in the surf on the seaward side. 4.4.69.

Lithophyllum moluccense Foslie
3971. Malindi, Silversands Beach. 3.12.67.
L. kotschyanum Unger.
3651. Diani — pools on reef. 20.8.67.
4643. „ — on lumps of old coral in pools and in depressions in the surf beyond the reef. 4.4.69.
4652. „ — in a pool on outer reef. 4.4.69.
4792. Tiwi. Moonlight Bay in pools on inshore dead reef. 6.4.69.

Melobesia sp.
4677, 4697. Tiwi, Moonlight Bay. 6.4.69.

Mesophyllum crispescens (Foslie) Lemoine
3956, 4701. Watamu Region; Blue Lagoon. 9.4.67.
M. erubescens (Foslie) Lemoine
3645. Diani — in pools on outer reef. 6.7.67.
4655. „ „ „ „ „ „ 4.4.69.
4651, 4654 „ — in depressions in surf on outer edge of the reef. 4.4.69.

Neogoniolithon accretum (Foslie & Howe) Setchell & Mason
4634, 4636, 4637, 4638, 4641. Diani outer reef in pools. 4.4.69.
N. trichotomum Heydrich
3955. Lamu Region—Manda Is. Kitau. 27.3.67.

Porolithon onkodes (Heydrich) Foslie
4635, 4644. Diani—outer reef in pools. 4.4.69.

C. *Non-Corallinaceae*
Peyssonnelia rubra (Grev.) J. Ag..
Durairatnam, 1961, p. 52.
Taylor, 1950, p. 121–122.
2909. Mombasa, Mackenzie Point. 8.12.65.
Plants mostly of dark rose-red colour, thin and with short non-separate rhizoids.

Gigartinales

Gelidiopsis intricata (Ag.) Vickers
Boergesen, 1943, pp. 53–54, Fig. 25.
Kuetzing, 1868, *Tab. Phyc.*, Vol. **18**, Pl. 35 sub nom. *Acrocarpus intricatus.*
2743A. Watamu, Turtle Bay. Epiphytic.
Determined by A. B. Cribb.

Gracilaria
The following species were previously recorded. *G. cacalia, crassa, edulis, millardetii, verrucosa* (Isaac, 1967), *arcuata, corticata, corticata* v. *ramalinoides* (Isaac, 1968).

G. arcuata Zanard. var. *snackeyi* Weber
Boergesen, 1943, pp. 69–71, Fig. 35.
4297. Diani, outer reef. 19.12.67.
The agreement with Boergesen is reasonably good and so this can be named v. *snackeyi* (prox).

G. bursa—pastoris (Gmel.) Silva
Ohmi, 1958, pp. 18–20, Pl. 3, C & D, Pl. 4, A & B.
Durairatnam, 1961, pp. 60–61.
Sub nom. G. compressa, Okamura, 1927, *Icones*, Vol. **5**, pp. 160–162, Pl. 242, Figs. 5–10.
Taylor, 1928, p. 152, Pl. 33, Fig. 1.
3212. Mokowe. 26.3.67.
3581. Gazi. Identified by Durairatnam. 11.8.67.
4793. Gazi, in channels in front of mangrove. Epiphytic (along with a number of other algal species) on *Halodule uninervis* (Forsk.) Aschers.

G. dura (Ag.) J. Ag.
Boergesen, 1951, pp. 41–42, Pl. 7.
The specimens collected although smaller are remarkably similar to that figured by Boergesen.

4501. Diani. Collected on old coral rocks of inshore reef which had recently been scoured by changing currents and were a new young growth. 30.11.68. Collected by Mrs. F. M. Isaac.

G. foliifera (Forsk.) Boergs.
Boergesen, 1933b.; p. 124.
„ 1939, pp. 109–110. Fig. 29, for a chondrus-like form.
Taylor, 1960, pp. 446–447, Pl. 55; fig. 1.
Durairatnam, 1961, p. 63, Pl. 31, Fig. 2.
Sub-nom. Fucus aeruginosus, Turn., 1811, Vol. **3**, pp. 29–30, Pl. 147.
A very variable species as a scrutiny of the relevant literature will indicate.
2071. Diani, outer reef. 16.3.65. Determined by Durairatnam.
2124. Diani, reef. 19.3.65.
2470. Diani, Cystocarpic. 18.7.65.
3118. Diani. 26.12.66.
3326. Ras Takwa, Manda Island. 30.3.67.
Similar to the Iranian gulf form figured by Boergesen (1939).
3871. Mambrui. 2.12.67. From as for 3326.
4370. Diani, on inshore reef ("Jadini Banks").

G. purpurascens (Harv.) J. Ag.
Ohmi, 1958, pp. 30–34, Pl. 6, C, D, & E.: Pl. 7, A. & B.
Sub-nom. Rhodymenia spinulosa Okamura, *Icones* 1922, Vol. **7**, p. 33, Pl. 318, Figs. 1–6.
The Kenya plants collected are, or approximate to f. *spinulosa* (Ohmi, 1958, pp. 32–34).
3861, 3882. Mambrui. 2.12.67.
3931. Malindi, near Vasco da Gama padrao. 4.12.67.
4679. Tiwi, Moonlight Bay. 6.4.69.

G. salicornia (C. Ag.) Dawson
Dawson, 1954, pp. 4–6, Fig. 3.
Ohmi, 1958, pp. 27–29; Pl. 5, F., Pl. 6, A.
Typical specimens of this species are distinctive in that all the branches, branchlets and segments of axes show clear constriction downwards to base of segment, the plant showing a succession of elongated inverted pyriform segments. *G. cacalia* on the other hand, shows little or no attenuation of segments in the basal parts of main branches although branchlets arising from branch apices show marked constriction (Boergesen, 1934). Kenya plants, however, have been collected which are intermediate between *G. salicornia* and *G. cacalia.*
2359. Mokowe, to seaward of Mangroves. 30.6.65.
2374. Lamu, on flats among mangrove to N.W. of town. 1.7.65.

Hypnea
The following species were previously recorded. *H. cervicornis, cornuta, harveyi, musciformis, rosea, valentiae* (Isaac, 1967); *boergesenii, nidulans* (Isaac, 1968).
H. esperi, Bory
Boergesen, 1950, p. 16.
Kuetzing, 1868, *Tab. Phyc*, Vol. **18**, Pl. 26.
Tanaka, 1938, p. 243, Fig. 15.
2250. Diani. 1.1.65.
2439. Manda Toto Island. 4.7.65.
4500. Diani, on scoured rocks; one of the earliest plants to return. 30.11.68.
The identification of these plants was aided by comparison with material named *H. esperi* by A. B. Cribb.

H. hamulosa (Turn.) Montagne
Turner, 1809 *Fuci*, Vol. **2,** l. 79, p. 19–20.
Tanaka, 1938, p. 245–246, Fig. 17.
Durairatnam, 1961, p. 56, Pl. 15, Figs. 10 & 11.
2552. Diani, outer reef. 30.7.65.

Sarcodia montagneana J. Ag.
Okamura, 1921, *Icones*, Vol. **4,** pp. 110–111, Pl. 177, Figs. 1 & 2. Pl, 178, Figs. 8–11.
Boergesen, 1954, pp. 28–30.
Sub nom. S. ceylanica, Kuetz., 1869, *Tab. Phyc*, Vol. **19,** p. 33.
This is a very variable species. Boergesen (1954) refers to this species not only *S. ceylanica* but also his own previous species *S. mauritiana* (Boergesen, 1952, pp. 29–31).
3878. Mambrui. 2.12.67. Cystocarpic.
3930. Malindi, near Vasco da Gama padrao. 4.12.67. Cystocarpic.
4327. Mambrui. 2.12.67. Approximating to sterile form figured by Okamura, 1921, Pl. 177, Fig. 1.
A common plant in places in Mambrui and Malindi. Only one inadequate and doubtful specimen (3502) found south of Malindi at North Cove, Diani.

Sarconema spp.
3851. Possibly *S. filiforme* (Sond.) Kylin
Boergesen, 1934, pp. 11–12, Fig. 7, Pl. 2.
Sub nom. *Cystoclonium filiforme* Kuetz.
Kuetzing, 1868, *Tab. Phyc.* Vol. **18,** Pl. 18.
3851. Mambrui. 2.12.67.
Shows a fair agreement in its anatomy with that of *S. filiforme* as figured by Kuetzing (1868) and Boergesen (1934). The plant is, however, more slender than indicated in Kuetzing figure.
4784. Watamu. July 1968, collected by F. Furnani. A larger, coarser plant which agrees well with *S. furcellatum* Zan.
Boergesen, 1934, p. 12, Fig. 8.
,, , 1939, pp. 11–112.
Sub. nom. Trematocarpus furcellatus Kuetz.
Kuetzing, 1869, *Tab. Phyc.* Vol. **19,** Pl. 73.

Ceramiales

Acanthophora dendroides Harv.
Boergesen, 1934, Pp. 22–23, Pl. 4.
3902. Mambrui. 2.12.67.

Acrosorium uncinatum (J. Ag.) Kylin
Taylor, 1960, pp. 552–553, Pl. 58, fig. 2.
Sub nom. Fucus laceratus, Turn., 1808, Fuci, Vol. **1,** pp. 151–152, Pl. 68.
Nitophyllum uncinatum (Turn.) J. Ag., Okamura, 1908, *Icones*, Vol. **1.,** pp. 121–122, Pl. 26.
Most of the plants collected were epiphytic on articulated corallines.
3900. Mambrui. 2.12.67. Determined by Ann Mitchell.
4510. Diani, outer Reef. 2.12.68. Epiphytic on *Cymodocea ciliata.*
4518. Diani, outer Reef. 2.12.68. Epiphytic on *Amphiroa anceps.*
4585. Tiwi, deep pools on seaward edge of inshore reef. 22.12.68. Epiphytic on *Amphiroa.*
4631. Malindi, Silversands beach. 3.12.67. Epiphytic on *Amphiroa anceps.*
4695. Lamu. July 1965.

Amphisbetema indica (J. Ag.) Weber van Bosse

Weber van Bosse, 1913, pp. 133–135, Fig. 1, Pl. 13, Fig. 24.

The identification of material of this species was confirmed by Womersley.

Forms more or less dense clumps of rose coloured plants near or at the outer reef edge. Characteristically it occurs rooted in sand or in the proximity of much sand.

2069. Diani. 16.3.65.
2494. ,, 27.7.65.
2934. ,, 9.12.65.
3136 ,, 27.12.66.
3614. ,, 20.8.67.
4550. ,, 20.12.68.

Conditions on the outer reefs at Diani seem well suited to this species.

Bartoniella crenata (J. Ag.) Kylin

Kylin, 1956, p. 432.

The material of this taxon was identified by Mrs. Ann Mitchell of Adelaide University.

3892. Mambrui. 2.12.67.
3897. ,, ,, . Epiphytic along with a number of other algae, on *Cymodoceae ciliata.*

Bostrichia

Most of the material of this genus was named by Dr. Erika Post who identified the following taxa—

B. binderi Harv. f. *terrestre.*

4758. Tiwi, Moonlight Bay. 2.1.70.

Intermingled with *B. tenella, Murrayella periclados, Catanella opuntia* and *Caulacanthus* sp. On cave walls and cliffs, splashed at neap tides.

B. binderi Harv. f. *typica* Post

4759. Tiwi, Moonlight Bay. 2.1.70 with some f. *terrestre* and *B. tenella.* Emersed at neap tides on cliffs and cave walls.

B. tenella (Vahl) J.Ag.

3936. Malindi, on cliffs near Vasco da Gama padrao 4.12.67.
4506. Diani, cliffs below Holyoak house. Dry at neap tides, above splash zone. Mingled with *B. binderi* and *Murrayella periclados.*

4758 and 4759, see above.

4761. Diani, North Cove. 30.6.67.

The numbers cited do not exhaust all the identifications made.

Cruania attenuata (Bonnemaison) J. Ag.

Okamura, 1926, *Icones*, Vol. **5**, pp. 124–125, Pl. 235, Figs. 15–21.
Taylor, 1928, p. 193, Pl. 27, Figs. 7–9, Pl. 32, Fig. 9.

2297. Diani, outer reef. 17.6.65.
2499. ,, ,, 27.7.65. Epiphytic on *Gelidiella acerosa.*
4752. Diani, outer reef. 1.8.69. Epiphyte on *Tolypiocladia glomerulata,* in turn epiphytic on *Liagora.*

Griffithsia rhizophora Grunow ex Weber van Bosse. Tentative

Abbott, 1946, pp' 443– 4, Pl. 1, figs. 5–9.

4694. Mida Creek. 6.4.69.

Tentative identification by R. N. Baldock who writes: "A small lateral with moniliform habit and forcipate apices makes me suspect that it is the rather gnarled base of an old plant of *G. rhizophora* that is just commencing regrowth." (Private communication).

3700. (6.9.67) is material of this species from the island of Mafia off the coast of Tanzania. Identified by Baldock.

Haloplegma duperreyi Mont.
Boergesen, 1945, pp. 11–16, Figs. 3–8 (Anatomical details); 1952, p. 52, Fig. 26 (whole plant); 1931, p. 14, Fig. 9.
Kuetzing, 1862, *Tab. Phyc.*, Vol. **12**, Pl. 62.
4541. Diani, outer reef. 20.12.68. Epiphytic on *Cymodocea ciliata.*
Spongy appearance under a lens and anatomical characteristics agree well with available descriptions of this species.

Laurencia
The following species were previously listed: *L. flexilis, obtusa, papillosa, perforata* (Isaac, 1967).

L. ceylanica J. Ag.
Durairatnam, 1961, p. 74, Pl. 17, Figs. 6 & 7.
3339. Manda Island, Ras Takwa. 30.3.67.
Determined by Durairatnam.

L. distichophylla J. Ag.
Boergesen, 1952, pp. 65–66, Fig. 32.
(Boergesen adds a "?" after J. Ag.)
2541. Tiwi. 1.8.65. Surface cells do not form a clear palisade and are not mammillate.
3624. Diani. 10.8.67.

L. obtusa (Huds.) Lamour. prox. var. *majuscula* Harv.
Tseng, 1943, p. 200.
Boergesen, 1933, pp. 135–136.
3014. Watamu, Turtle Bay. 6.4.66.
Determined by A. B. Cribb.

L. parvipapillata Tseng
Tseng, 1943, pp. 204–205, Pl. 4.
This species has a characteristic anatomy. In transverse section the epidermal cells are very markedly mammillate, otherwise subquadrate and somewhat radially elongated.
2426. Kitau, Manda Island. 2.7.65.
Somewhat smaller than Tseng's description. Anatomy as indicated above.
These plants formed cushions at low inter tidal levels; dark green in colour with pinkish tipped short branches.

Murrayella periclados (C. Ag.) Schmitz
Kylin, 1956, pp. 516–517, Fig. 410.
Taylor, 1960, p. 593.
The following identifications of this species were made by Dr. Erika Post. The plant was intermingled with other species.
4390. Diani. 11.4.67. Cliffs.
4506. „ 30.11.68.
4758. Tiwi, Moonlight Bay. 2.1.70.
4760. „ „ „ „ , Sorted out and determined by F.M. Isaac.

Spermothamnion sp.
3864. Mambrui. 2.12.67. Tetrasporic plants.
In this material the tetrasporangia are all sessile. Otherwise the plants have the general vegetative characters of *S. cymodocea* (Boergesen, 1952, pp. 54–57, Figs. 27 & 28).

LITERATURE CITED

ABBOTT, ISABELLA, A., 1946, "The Genus Griffithsia (Rhodophyceae) in Hawaii", *Farlowia*, **2**, pp. 439–444 and 4 Plates.

_____, 1970, "*Yamadaella*, a new genus in the Nemalionales (Rhodophyta)", *Phycologia*, 19 (2) pp, 115-123.

AGARD, J. D., "Species Sargassorum Australiae descriptae et dispositae", *Ksvenska. Sv. Vetensk. Akad.* Handl. Bd. **23**, no. 3, Stockholm, 1889.

BAROTT, E. S., The Genus Halimeda, *Siboga-Expeditie*, Monograph 40 Leiden, 1901.

BOERGESEN, F., 1933(a)., "Some Indian Green and Brown Algae especially from the shores of the Presidency of Bombay—III.", *J. Indian Bot.*, **12**, pp. 1–16 and 5 plates.

_____, 1933(b)., "Some Indian Rhodophyceae especially from the shores of the Presidency of Bombay. III.", *Kew Bull.*, No. 3, 1933, pp. 113–142 and 5 plates.

_____, 1934, Ibid, IV., Kew Bull. No. 1 1934, pp. 1—30 and 4 plates.

_____, 1942–54., "Some Marine Algae from Mauritius", "III. Rhodophyceae, Pt. 1, Porphyridiales, Bangiales, Nemalionales", *Biol. Medd. Dan. Vid. Selsk.*, **17**(5), 1942.

_____, "III. Rhodophyceae, Pt. 2, Gelidiales, Cryptonemiales, Gigartinales", *Ibid*, **19**(1), 1943.

_____, "III. Rhodophyceae, Pt. 4, Ceramiales" *Ibid*, **19**(10), 1945. (Second Edition, 1956).

_____, "An additional list of species to Part 1 Chlorophyceae", *Ibid*, **20**(6), 1946.

_____, "Additional Lists to the Chlorophyceae and Phaeophyceae", *Ibid*, **20**(12), 1948.

_____, "Additions to the parts previously published. II", *Ibid*, **18**(11), 1950.

_____, "Additions to the parts previously published, III", *Ibid*, **18**(16), 1951.

_____, "Additions to the parts previously published, IV", *Ibid*, **18**(19), 1952,

_____, "Additions to the parts previously published, V", *Ibid*, **21**(9), 1953.

_____, "Additions to the parts previously published, VI", *Ibid*, **22**(4), 1954.

CHOU, R. C-Y., 1947. "Pacific species of Galaxaura II. Sexual Types", *Pap. Mich. Acad. Sci., Arts & Letters*, **31**, pp. 3–24 and 13 Plates.

CRIBB, A. B. 1954, "Records of Marine Algae from South-Eastern Queensland 1", *Pap., Dep. Bot. Univ. Qd*, **3**(3), pp. 16–37.

1960. *Ibid*, **5**, **4**(1)., pp. 1–31.

DAWSON, E. Yale, 1944. "The Marine Algae of the Gulf of California", Allan Hancock Pacific *Expeditions*, Vol. **3**(10), pp. 189–452, including 47 plates. *Univ. Southern Calif Press*, Los Angeles.

_____, 1954. "Notes on Tropical Pacific Marine Algae", *Bull. Southern Calif. Acad. Sciences*, **53**(1), pp. 1–7.

_____, 1957. "An Annotated List of Marine Algae from Eniwetok Atoll, Marshall Islands", *Pac. Sci.*, **XI**, pp. 92–132.

DE TONI, J. B. *Sylloge Algarum*, Vol. **1**, Pp. 1–532. (*Sylloge Chlorophycearum*), Batavii, 1889.

DICKINSON, C. I., 1950. "Two New Species of Gelidium from Natal", *Kew Bull* for 1949, Vol. **4**(4), 1968, pp. 565–567.

DROUET, FRANCIS. "Revision of the classification of the Oscillatoriaceae", *Acad. Nat. Sciences Philadelphia*. Monograph **15**.

DUCKER, S. C., 1967. "The Genus Chlorodesmis (Chlorophyta) in the Indo-Pacific Region", *Nova Hedwigia*, **13**, 145–182, pls. 25–43.

_____, 1969. "Additions to the genus *Chlorodesmis* (Chlorophyta)", *Phycologia*, **8**(1), pp. 17–20.

DURAIRATNAM, M., 1961 "Contributions to the study of the Marine Algae of Ceylon", *Fisheries Research Sta. Ceylon*, Bull. No. **10**. Government Press Ceylon.

EGEROD, LOIS, E., 1952. "An Analysis of the Siphonous Chlorophycophyta", *Univ. Calif. Publs Bot.*, **25**(5), pp. 325–454.

GERLOFF, J., 1960. "Meeresalgen aus Kenya, 1, Cyanophyta und Chlorophyta", *Willdenowia*, **2**(4), pp. 604–627.

GREVILLE, R. K., 1849. "Algae Orientalis:— Descriptions of new species belonging to the genus Sargassum," *Ann. & Mag. nat. Hist.*, **3**, 2nd. Series, pp. 106–109, Pl. 4, and pp. 216–219, Pl. 9.

HILLIS, LLEWELLYA, W., 1959. "A Revision of the Genus *Halimeda* (Order Siphonales)", *Institute Marine Sci.*, **6**, pp. 321–403.

ISAAC, WM. EDWYN., 1967. "Marine Botany of the Kenya Coast. 1. A First List of Kenya Marine Algae", *Jl E. Africa nat. Hist. Soc.*, **26**, pp. 75–81.

_____, 1968. "Marine Botany of the Kenya Coast. 2. A Second List of Kenya Marine Algae", *Ibid*, **27**, pp. 1–6.

ISAAC, WM. EDWYN & FRANCES, M., 1968. "Marine Botany of the Kenya Coast. 3. General Account of the Environment, Flora and Vegetation", *Ibid*, **27**, pp. 7–28.

KUETZING, F. T., 1858–69. *Tabulae Phycologicae*, Nordhausen, Vols. **8** (1858), **9** (1859), **11**(1861), **12**(1862), **18**(1868), **19**(1869).

KYLIN, H., 1938. "Verzeichnis einiger Rhodophyceen von Südafrika", *Lunds. Univ.* Arsskr. N.F., 1956 Avd. 2, **34**(8).

_____, *Die Gattungen der Rhodophyceen, Lund.*

MOORJANI, S. A. 1969. "Notes on Kenya *Acetabularia* Lamouroux", *Jl E. Africa nat. Hist. Soc.* Vol. 28, No. 1 (119), pp. 47-52

OHMI, H., 1958. "The Species of Gracilaria and Gracilariopsis from Japan and Adjacent Waters", *Memoirs Fac. Fisheries, Hokkaido Univ.*, **6**(1), pp. 1–66 and 10 plates.

OKAMURA, K., 1907–42 *Icones of Japanese Algae.* Tokyo. Vols. **1**(1907–09), **4**(1961–23), **5**(1923–28), **7**(1933–42).

PAPENFUSS, C. F., 1944. "Notes on algal nomenclature. III. Miscellaneous species of Chlorophyceae Phaeophyceae and Rhodophyceae", *Farlowia*, **1**(3), pp. 337–346.

_____, 1950. "On the identity of *Spongocladia* and *Cladophoropsis*", *Pac. Sci.*, **4**, pp. 208–213.

SETCHELL, W. A., 1929. "The Genus *Microdictyon*", *Univ. Calif. Publs Bot.*, **14**(20), pp. 453–588.

SILVA, P. C., 1959. "The Genus *Codium* (Chlorophyta) in South Africa", *J. S. Afr. Bot.*, **25**(2), pp. 103–165 and 14 plates.

SVEDELIUS, N., 1953. "Critical Studies on some Species of *Galaxaura* from Hawaii", *Nova Acta. R. Soc. Scient. upsal.*, Ser 4, Vol. **15**, No. 9, 92 Pp.

TANAKA, T., 1938. "The Genus *Hypnea* in Japan", *Scient. Pap. Inst. algol. Res., Hokkaido Univ*, **2**(2), pp. 227—250, 2 plates.

1967. "Some Marine Algae from Batan and Camignin Islands, Northern Philippines—1", *Memoirs Faculty of Fisheries, Kagoshima University*, **16**, pp. 14—16.

TAYLOR, WM. RANDOLPH, 1928. *The Marine Algae of Florida with special Reference to the Dry Tortugas Lab.*, **25**: pp. 219, 37 pls. (Reprinted 1967 Band **2**, *Bibliotheca Phycologica*).

_____, 1942. "Caribbean Marine Algae of the Allan Hancock Expedition, 1939", Allan Hancock Atlantic Expedition, Rpt. 2. Univ. S. Calif. Press, Los Angeles, 147 pp., 20 pls.

_____, 1950. Plants of Bikini and other Northern Marshall Islands., Ann Arbor, Univ. Mich. Press

_____, 1960. Marine Algae of the Eastern Tropical and Subtropical coasts of the Americas. Ann Arbor, Univ. Mich. Press.

TSENG, C. K., 1943. "Marine Algae of Hong Kong. IV The Genus *Laurencia*", *Mich. Acad. Sci., Arts, & Letters*, **28**, pp. 185–208 and 4 plates.

TURNER, DAWSON., 1808—1819. *Fuci.*, Vols. **1**(1808), **2**(1809), **3**(1811), **4**(1819). London.

WEBER VAN BOSSE, A., 1913. "Marine Algae, Rhodophyceae, of the 'Sealark' Expedition, collected by Mr. J. Stanley Gardiner, M.A.", *Trans. Linn. Soc. Lond.*, 2nd Seri. Botany, Vol. **8**(3).

_____, and FOSLIE, M. 1904. The Corallinaceae of the Siboga-Expedition, Siboga-Expedition, Monograph 61. Leiden,

ZANARDINI, J., 1858. "Plantarum in Mari Rubro hucusque collectarum enumeratio", *R. Inst. Venet.*, **7**(2).

(Received 4th June 1970)